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(54) Articulated duct

(57) An articulated duct comprises duct sections (2, 3, 4, 5) connected together by friction elbow joints (6) and flexible bellows members (7). Each friction elbow joint (6) comprises at least one pair of arms (8, 9) one end of each of which is secured to one of the adjacent ends of said duct sections and the other ends of which overlap and are pivotally connected together by a pivot member (13). A friction pad (11) is interposed between the overlapping ends of the arms (8, 9). Preferably a friction washer (12) is provided on the opposite side of one of the arms (9) to the friction pad (11) and a disc spring (12a) is provided on the opposite side of the other arm (8) to maintain the arms (8, 9) in frictional engagement with the friction pad (11) and friction washer (12).

The friction pad (11) and friction washer (12) provide sufficient frictional resistance with the arms (8, 9) to maintain the duct sections in a required articulated position whilst permitting their articulation to a different required position.

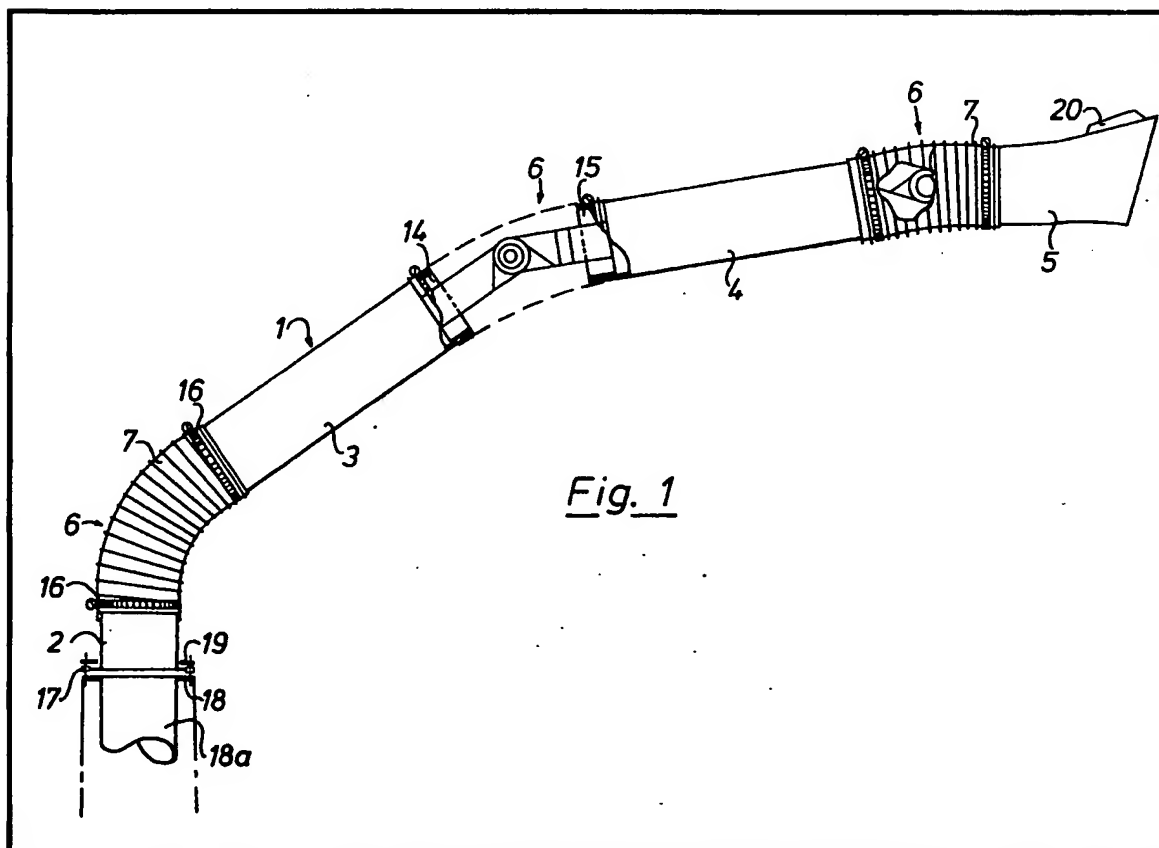


Fig. 1

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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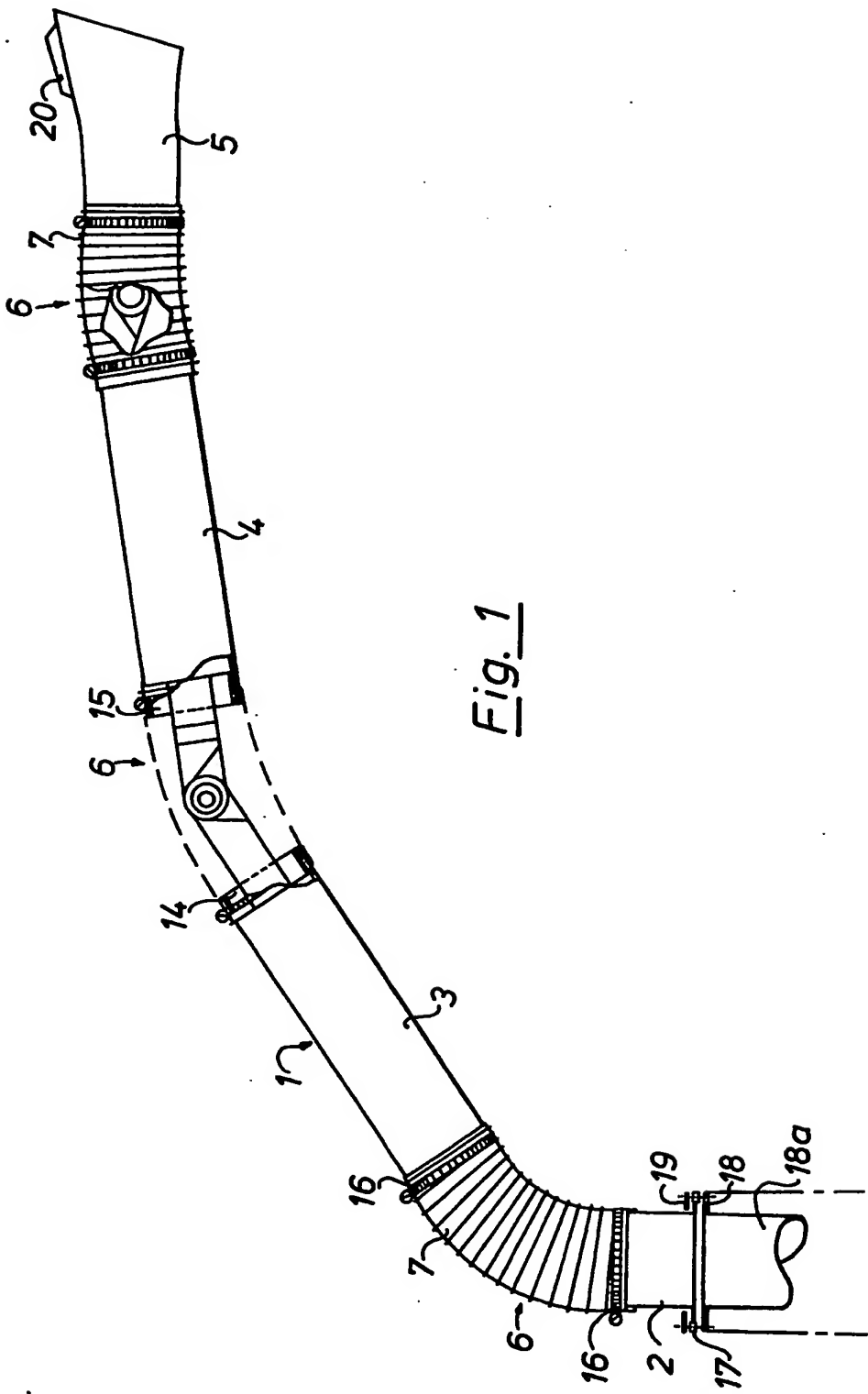


Fig. 1

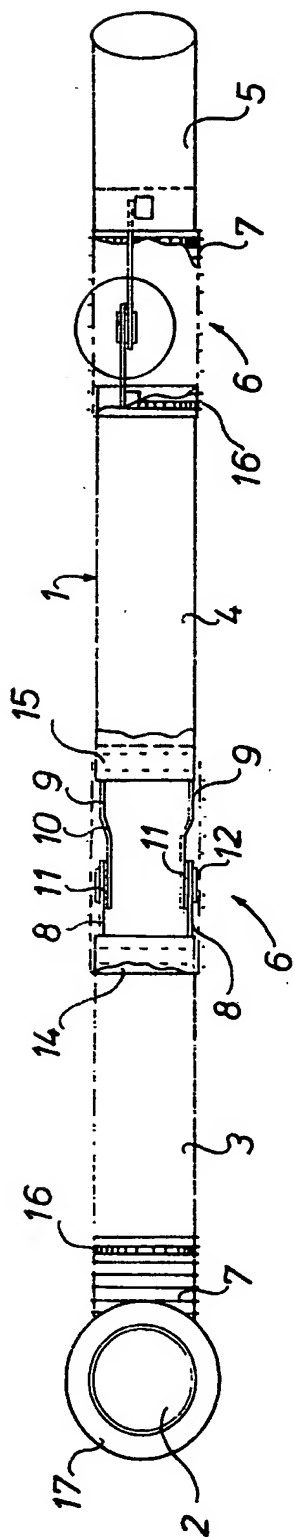


Fig. 2

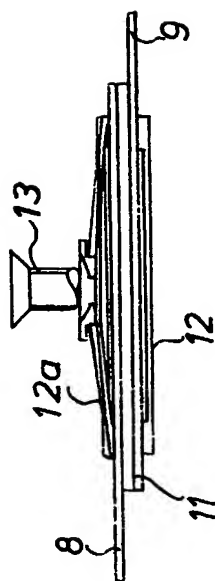


Fig. 3

## SPECIFICATION

### Articulated duct

- 5 This invention relates to ducting for air extractor or air blowing means.

In many industrial operations, such as welding or sanding, smoke, fumes and/or dust are produced which for health and safety reasons  
10 need to be removed at source before they enter the general atmosphere of the factory or workshop. Where such industrial operations are carried out at a fixed location it is a simple matter to provide suitable air extractor means at that location. However, when there is a  
15 requirement for such industrial operations to be carried out at various different locations it becomes necessary to provide air extractor means which can be positioned, within limits, at a required location.

The present invention has as its object to provide an articulated duct for use with air extractor or air blowing means whereby an  
20 inlet or outlet end of such duct can readily be positioned as required.

The present invention provides an articulated duct comprising at least two duct sections which are connected together by a friction elbow joint whereby said sections can be  
25 articulated relative to one another.

Said friction elbow joint may comprise a pair of arms one end of each of which is connected to one of the adjacent ends of said duct sections and the other ends of which are  
30 pivotally connected together with the interposition therebetween of a friction pad which will create sufficient frictional resistance in the pivotal connection as to maintain the duct sections in a required articulated position whilst allowing their articulation to a different  
40 required position. A further friction pad may be provided on the opposite side of one of each arm to said first friction pad so that said other end of one or each arm is sandwiched between two friction pads. Where a further  
45 friction pad is provided on the opposite side of one arm only, a suitable resilient means, e.g., a disc spring or spring washer, may be provided on the opposite side of the other arm, said resilient means serving to maintain  
50 frictional engagement between said arms and said friction pads. Preferably the adjacent ends of the duct sections each have a pair of diametrically opposed arms extending outwardly therefrom each of which is pivotally  
55 connected to the corresponding arm of the other duct section.

Said duct sections may be formed from sheet metal material and in order to provide  
60 sufficient support for said arms the adjacent ends of the duct sections may each have a metal ring secured, e.g., welded, thereto, preferably internally thereof, said one end of said arms being secured, e.g., welded, to said  
65 rings.

A flexible bellows member extends between the adjacent ends of the duct sections over said friction elbow joint.

Preferably the duct comprises a plurality of  
70 duct sections, e.g., four sections, which are connected together by friction elbow joints as aforesaid. A first duct section at one end of the duct may be connectable to suitable air extractor or air blower means by way of a  
75 swivel joint so that said first duct section can be rotated through 360°. The duct section at the other end of the duct may be flared outwardly toward its outer end to form an inlet or outlet hood.

The duct of the present invention may be used with any suitable air extractor or air blowing means, e.g., may be used with portable air extractor means such as a portable electrostatic air cleaner or air filter apparatus,  
80 or may be used with fixed air extractor or air blowing means such as by being connected to a fixed duct of an air conditioning or air cleaning system.

The invention will be more particularly described with reference to the accompanying drawings, in which:-

*Figure 1* is an elevation, partly in section, of an articulated duct according to the invention, *Figure 2* is an underneath plan view of the  
95 duct of *Fig. 1*, and

*Figure 3* is a detail view of a friction elbow joint used in the duct of *Figs. 1* and *2*.

Referring to the drawings it will be seen that the duct 1 illustrated comprises for sheet  
100 metal duct sections 2, 3, 4, 5 which are connected together by friction elbow joints generally indicated at 6 and by flexible bellows members 7.

The friction elbow joint 6 between the duct  
105 sections 3 and 4 comprises a pair of diametrically opposed arms 8 extending outwardly from the duct section 3 and a pair of diametrically opposed arms 9 extending outwardly from the duct section 4, the arms 9 each being cranked as shown at 10 so that the  
110 outer end of each of the arms 9 overlaps the outer end of an arm 8. Friction pads 11 are interposed between the overlapping ends of the arms 8 and 9 and a friction washer 12 is provided on the opposite side of the arm 9 to the friction pad 11. On the opposite side of the arm 8 to the friction pad 11 is a disc  
115 spring 12a which maintains the arms 8 and 9 in frictional engagement with the friction pad 11 and friction engagement with the friction washer 12. If desired or necessary a second friction washer 12 could be interposed between arm 8 and disc spring  
12a. A screw, bolt, rivet or like pivot member  
125 13 extends through the overlapping ends of the arms 8 and 9 and through the friction washer 12, disc spring 12a, and the friction pad 11 to pivotally connect each arm 8 to an arm 9. The friction pad 11 and friction  
130 washer 12 provide sufficient frictional resis-

tance with the arms 8 and 9 to maintain the duct sections in a required articulated position whilst permitting their articulation to a different required position. Each of the arms 8 is welded or otherwise secured to a ring 14 welded or otherwise secured within the adjacent end of the duct section 3. Likewise each of the arms 9 is secured to a ring 15 secured within the adjacent end of the duct section 4.

- 10 The friction elbow joint 6 between the duct sections 2 and 3 is exactly the same as that between the duct sections 3 and 4. The friction elbow joint 6 between the duct sections 4 and 5 is similar to that between the duct sections 3 and 4, the only difference being that instead of the arms 8 and 9 being in diametrically opposed pairs they are secured to an upper portion of each of the rings 14 and 15 and extend outwardly and downwardly instead of in the axial direction of their respective duct sections as in the case of the other friction elbow joints 6.

- 25 The flexible bellows members 7 each extend over a friction elbow joint 6 and are secured to the adjacent ends of adjacent duct sections by means of suitable clips or clamps 16.

- 30 The duct section 2 has an annular flange 17 thereon which is received between a seating ring 18 on a fixed duct 18a and a securing ring 19 secured to the seating ring 18 so as to provide a swivel joint enabling the duct section 2 to be rotated about its axis through 360°.

- 35 The duct section 5 flares outwardly as shown towards its outer end to form an inlet or outlet hood. A handle 20 is provided on the duct section 5 to facilitate the movement of this duct section to a required position.

- 40 It will readily be appreciated that because the duct 1 can be rotated about the axis of the duct section 2 and because the duct sections can be articulated relative to one another by virtue of the friction elbow joints 6, the duct section 5 which forms the inlet or outlet hood can be positioned as required anywhere within a radius determined by the maximum extent of the duct 1.

- 50 The fixed duct 18a may be either a fixed duct of a portable air extractor or air blower means, e.g., a portable electrostatic air cleaning apparatus, or may be a fixed duct of an air cleaning or air conditioning installation.

## 55 CLAIMS

1. An articulated duct comprising at least two duct sections which are connected together by a friction elbow joint whereby said duct sections can be articulated relative to one another.

2. An articulated duct according to claim 1, wherein said friction elbow joint comprises a pair of arms one end of each of which is connected to one of the adjacent ends of said duct sections and the other ends of which are

pivotaly connected together with the interposition therebetween of a friction resistance in the pivotal connection as to maintain the duct sections in a required articulated position whilst allowing their articulation to a different required position.

3. An articulated duct according to claim 2, wherein a second friction pad is provided on the opposite side of at least one of said arms so that said other end of the at least one arm is sandwiched between two friction pads.

4. An articulated duct according to claim 3, wherein a second friction pad is provided on the opposite side of one arm only and wherein resilient means is provided on the opposite side of the other arm said resilient means serving to maintain frictional engagement between said arms and said friction pads.

5. An articulated duct according to claim 4, wherein said resilient means comprises a disc spring or spring washer.

6. An articulated duct according to any one of the preceding claims, wherein said duct sections are connected together by two said friction elbow joints.

7. An articulated duct according to claim 6, wherein the adjacent ends of the duct sections each have a pair of diametrically opposed arms extending outwardly therefrom each of which is pivotaly connected to the corresponding arm of the other duct section.

8. An articulated duct according to any one of the preceding claims, wherein said duct sections are formed from sheet metal material.

9. An articulated duct according to claim 8, wherein the adjacent ends of the duct sections each have a metal ring secured thereto, said one end of said arms being secured to said rings.

10. An articulated duct according to claim 9, wherein said rings are secured internally of the adjacent ends of the duct sections.

11. An articulated duct according to any one of the preceding claims, wherein a flexible bellows member extends between the adjacent ends of the duct sections over said friction elbow joint.

12. An articulated duct substantially as herein described with reference to the accompanying drawings.